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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.
08/965,332	11/06/97	BONIN	W	55463-101-10

MM41/0428

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EXAMINER	
LARKIN, D	
ART UNIT	PAPER NUMBER
2856	11

DATE MAILED: 04/28/98

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/965,332	Applicant(s) Bonin	
	Examiner Larkin		Group Art Unit 2856

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE THREE (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☐ Responsive to communication(s) filed on 06 November 1997.

☑ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☑ Claim(s) 41-64 is/are pending in the application.

Of the above claim(s) ______ is/are withdrawn from consideration.

☐ Claim(s) ______ is/are allowed.

☑ Claim(s) 41-64 is/are rejected.

☐ Claim(s) ______ is/are objected to.

☐ Claim(s) ______ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☑ The proposed drawing correction, filed on 25 February 1997 is ☑ approved ☐ disapproved.

☐ The drawing(s) filed on ______ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) ______.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received: ______.

Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). ______

☐ Notice of References Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other ______

Office Action Summary

1. Claim 50 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

Re claim 50: The phrase "the means for measuring the output signal of the force sensor" lacks antecedent basis.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 41, 42, and 45-47 are rejected under 35 U.S.C. § 102(b) as being anticipated by Thomas. The reference to Thomas discloses a first capacitive transducer (10) which utilizes a metal disc shaped plate (22) as a pick-up plate and electrodes A, A' and B, B' as drive plates for detecting displacement of the pick-up plate (22) in a first direction. The pick-up plate (22) is connected to a lever (12) which transmits a force to the plate (22) and thereby changes the capacitance of the device (10) as the metal plate (22) is manually manipulated. The disclosure also states that the lever (12) can be used as a stylus for contacting a workpiece (i.e. a force sensor) (col. 2, lines 45-48). A signal conditioning system is provided for providing an output signal which is linearly proportional to the displacement of the pick-up plate/electrode (22). An alternate embodiment of the device shown in Figure 10 provides for a sinusoidal AC oscillator (142) which provides a signal to a transformer (T2) which has its two ends connected to plates A and B of the differential transducer (30). Another embodiment of the device provides for a charge amplifier (48) to receive the signal produced on the pick-up plate/central electrode (22) and then sending the output of the charge amplifier (48) to a phase sensitive rectifier (50) which acts as a synchronous demodulator to produce a DC signal. The signal from the phase sensitive rectifier (50) is later digitized such that the digital output is linearly proportional to the displacement of the pick-up plate/electrode (22).

4. Claims 43, 44, 48, 49, and 51-55 are rejected under 35 U.S.C. § 103 as being unpatentable over Thomas as applied to claims 41 and 47 above, and further in view of Slinkman et al. and Burnham et al. (5,193,383). The reference to Thomas fails to disclose means for utilizing the output signal to control a movement of the scanning head relative to the sample or means for providing an image of the surface topography based upon the output signal. The reference to

Slinkman et al. discloses a scanning capacitance-voltage microscope which utilizes a probe tip which is movable in the X, Y, and Z directions. A capacitance sensor gathers signals from the probe tip and outputs a signal used by a computer to generate a capacitance display. A proximity sensor is provided to monitor the spacing between the probe tip and the sample. An output signal from the proximity sensor is used in a feedback control device for moving the probe tip in the needed direction. The topography of the sample is also displayed. The reference to Burnham et al. ('383) discloses a surface force nanoprobe which has the ability to either measure surface imaging capabilities like a scanning force microscope by using a probe which can be monitored using capacitive detection means or provide a probe to measure the hardness of samples through indentation. A computer is used to gather output signals and a monitor is provided to display the surface image. The monitor is coupled to the feedback electronics and the force probe can be adjusted by the operator to measure three different measurements. It would have been obvious for one of ordinary skill in the art to have provided a means for providing an image of the output signals so as determine the various mechanical properties of the sample. The operator control would also have been obvious for one of ordinary skill in the art as a means to control the measuring process and to possibly prevent damage to either the sample due to an aggressive probe strike or to the probe tip contacting a hard surface. It would have been obvious for one of ordinary skill in the art to have provided a feedback type mechanism to control the movement of the scanning head so as to provide more accurate measurements by allowing the scanning head to be more easily and accurately positioned with respect to the sample surface. Although the reference fails to disclose maintaining a constant force while the surface property is measured, the Examiner deems this limitation to be well known to those in the scanning probe microscopy field given that the most popular forms of scanning involve either maintaining a constant height between the sample and the probe tip or maintaining a constant force between the probe tip and the sample.

5. Claim 43, 44, and 48-50 are rejected under 35 U.S.C. § 103 as being unpatentable over Thomas as applied to claims 41 and 47 above, and further in view of Weissenbacher et al. The reference to Thomas fails to disclose means for maintaining a constant force of the sample, means

for applying a downward force to the probe, and means for converting the output signal of the force sensor into a signal representative of the force of an indentation test. It would have been obvious for one of ordinary skill in the art to have provided a means for applying a downwards force to the probe as well as a means to maintain the force between the sample and the probe tip as a constant because Weissenbacher et al. disclose a hardness tester used for indentation testing of samples whereby the indentor is connected with a force gauge which emits an electronic signal corresponding to the load applied to the sample. The output signals of the force gauge are provided to a drive unit through a comparator circuit which provides a mechanism for moving the indentor to contact the sample surface. The motor for driving the indentor maintains a constant load on the sample.

6. Claims 56-58 and 60-64 are rejected under 35 U.S.C. § 103 as being unpatentable over Thomas in view of Bonin et al., Slinkman et al., and Burnham et al. (5,193,383). The reference to Thomas discloses a first capacitive transducer (10) which utilizes a metal disc shaped plate (22) as a pick-up plate and electrodes A, A' and B, B' as drive plates for detecting displacement of the pick-up plate in a first direction. The pick-up plate (22) is connected to a lever (12) which transmits a force to the plate (22) and thereby changes the capacitance of the device (10) as the metal plate (22) is manually manipulated. The disclosure also states that the lever (12) can be used as a stylus for contacting a workpiece (i.e. a force sensor) (col. 2, lines 45-48). A signal conditioning system is provided for providing an output signal which is linearly proportional to the displacement of the pick-up plate/electrode (22). An alternate embodiment of the device shown in Figure 10 provides for a sinusoidal AC oscillator (142) which provides a signal to a transformer (T2) which has its two ends connected to plates A and B of the differential transducer (30). The transformer (T2) feeds phase and antiphase sinusoidal signals to the electrode plates A and B. The reference to Thomas fails to suspend the central plate electrode by spring means. Bonin et al. disclose a capacitive accelerometer having two outer substrates with an inner and outer metalized surface, two spacer substrates, and a third substrate with an etched metal plate which displaces accordingly in response to acceleration changes due to its spring/plate arrangement. It would have been obvious for one of ordinary skill in the art to have modified the

central plate of Thomas to appear more like that of Bonin et al. so as to allow the central plate to remain more stable within the force sensor arrangement. The references to Thomas and Bonin et al. both fail to disclose means for providing an output signal which is representative of the surface property being measured, means for utilizing the output signal to control a movement of the scanning head relative to the sample, or means for providing an image of the surface topography based upon the output signal. The reference to Slinkman et al. discloses a scanning capacitance-voltage microscope which utilizes a probe tip which is movable in the X, Y, and Z directions. A capacitance sensor gathers signals from the probe tip and outputs a signal used by a computer to generate a capacitance display. A proximity sensor is provided to monitor the spacing between the probe tip and the sample. An output signal from the proximity sensor is used in a feedback control device for moving the probe tip in the needed direction. The topography of the sample is also displayed. Burnham et al. ('383) disclose a surface force nanoprobe which has the ability to either measure surface imaging capabilities like a scanning force microscope by using a probe which can be monitored using capacitive detection means or provide a probe to measure the hardness of samples through indentation. A computer is used to gather output signals and a monitor is provided to display the surface image. The monitor is coupled to the feedback electronics and the force probe can be adjusted by the operator to measure three different measurements. It would have been obvious for one of ordinary skill in the art to have provided a means for providing an image of the output signals so as determine the various mechanical properties of the sample. The operator control would also have been obvious for one of ordinary skill in the art as a means to control the measuring process and to possibly prevent damage to either prevent damage to the sample by an aggressive probe strike or to the probe tip contacting a hard surface. It would have been obvious for one of ordinary skill in the art to have provided a feedback type mechanism to control the movement of the scanning head so as to provide more accurate measurements by allowing the scanning head to be more easily and accurately positioned with respect to the sample surface. Although the reference fails to disclose maintaining a constant force while the surface property is measured, the Examiner deems this limitation to be well known to those in the scanning probe microscopy field given that the most popular forms of scanning

involve either maintaining a constant height between the sample and the probe tip or maintaining a constant force between the probe tip and the sample.

7. Claims 57-59 are rejected under 35 U.S.C. § 103 as being unpatentable over Thomas in view of Bonin et al., Slinkman et al., and Burnham et al. (5,193,383) as applied to claim 56 above, and further in view of Weissenbacher et al. The references to Thomas and Bonin et al., Slinkman et al., and Burnham et al. ('383) all fail to disclose means for maintaining a constant force of the sample and means for converting the output signal of the force sensor into a signal representative of the force of an indentation test. It would have been obvious for one of ordinary skill in the art to have provided a means for applying a downwards force to the probe as well as a means to maintain the force between the sample and the probe tip is constant because Weissenbacher et al. disclose a hardness tester used for indentation testing of samples whereby the indentor is connected with a force gauge which emits an electronic signal corresponding to the load applied to the sample. The output signals of the force gauge are provided to a drive unit through a comparator circuit which provides a mechanism for moving the indentor to contact the sample surface. The motor for driving the indentor maintains a constant load on the sample.

8. This is a continuation of applicant's earlier Application No. 08/690,909. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however,

event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Daniel Larkin whose telephone number is (703) 308-6724. The Examiner can normally be reached on Monday-Friday from 7:00 AM - 4:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Hezron E. Williams, can be reached on (703) 305-4705. The FAX telephone number for this Technology Center (Center 2800, unit 2856) is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4900.

Daniel Larkin
DANIEL S. LARKIN
PATENT EXAMINER
GROUP 2200

24 April 1998

MICHAEL BROCK
PRIMARY EXAMINER
GROUP 2200